

Remarks/Arguments:

By this Amendment, Applicants have amended claim 8. Claims 8-11 are pending.

Claim Rejections Under Section 103

Claims 8-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Azuma and Zafar. By this Amendment, Applicants respectfully traverse the § 103(a) rejection.

The Azuma Patent issued on October 13, 1998, was filed on October 9, 1997 and is a continuation of Application No. 421,544 filed April 13, 1995 (abandoned). The subject application is a continuation of U.S. Patent Application No. 10/293,154, filed November 13, 2002, which is a continuation of U.S. Patent Application No. 09/484,473, filed January 18, 2000, now U.S. Patent No. 6,620,738, which in turn is a divisional of U.S. Patent Application No. 09/116,727, filed July 16, 1998. The '725 Application claims priority based on Japanese Application No. 9-191179, filed July 16, 1997.

While the Azuma Patent is cited under § 103(a), if it is appropriate prior art, it is prior art under § 102(e).

Section 103(c) states that "Subject matter developed by another person which qualifies as prior art only under one or more of subsection (e), (f), and (g) of § 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the claimed invention was made, owned by the same person or subject to an obligation of assignment to the same person."

Applicants contend that the Azuma Patent and the subject application are and were at the time the claimed invention was made owned by Matsushita Electronics Corporation of Japan. Thus, the Azuma Patent is not prior art based on § 103(c). This leaves the basis for the § 103(a) rejection only on the basis of the Zafar Patent. It is Applicants contention that the Zafar Patent does not anticipate or render obvious the semiconductor device defined by Applicants amended claim 8.

Claim 8 is an independent claim to which claims 9-11 depend.

Claim 8 is directed to a semiconductor device having a titanium material layer and a silicon oxide layer produced by a process including the step of:

- etching at least one of the titanium material layer and the silicon oxide layer using an etchant, wherein
- the titanium material layer includes at least one material selected from the group consisting of BaTiO₃, SrTiO₃, Ba_xSr_(1-x)TiO₃, and similar Group IIA metal titanates,

the titanium material layer is provided between an upper electrode and a lower electrode, and a first contact window is provided for the lower electrode and a second contact window is provided on the titanium material layer for the upper electrode, wherein an interconnect material layer is provided over and inside each of the first and second contact windows, and the interconnect material layer that is provided over and inside the second contact window acts as an upper electrode,

- the etchant includes a mixed liquid of HCl, NH₄F and H₂O; and
- setting a molar ratio of NH₄F/HCl in the mixed liquid, the molar ratio being set based on which of the at least one of the titanium material layer and the silicon oxide layer is to be etched.

It is Applicants contention that the semiconductor device defined by claim 8 is patentably distinguished from the Zafar Patent at least based on the requirement that the first contact window is provided for the lower electrode and a second contact window is provided on the titanium material layer for the upper electrode, wherein an interconnect material layer is provided over and inside each of the first and second contact windows, and the interconnect material layer that is provided over and inside the second contact window acts as an upper electrode (hereinafter generally referred to as the "First and Second Contact Windows Feature" of Applicants' claimed invention). In other words, the First and Second Contact Windows Feature is neither taught nor suggested in the Zafar Patent.

The Amendment of claim 8 defining the First and Second Contact Window Feature is not the addition of new matter, but is based on the disclosure throughout the originally filed application. In this connection, Applicants direct the Examiner's attention, for example, to Figure 3D, and Example 3, page 9, lines 2-11 of the originally filed specification, and in particular the statement that "an interconnect material layer 9 is found on the second silicon oxide layer 7b so as to fill the holes 8a. . . The interconnect material layer 9 acts as an upper electrode layer."

The Zafar Patent relates in general to a process for forming a semiconductor device having a ferroelectric capacitor. More specifically, Figures 2-5 of the Zafar Patent show one or more dielectric layers 32, 52 which are formed over a ferroelectric capacitor 24 of a FENVN cell, where the tension within the dielectric layers 32, 52 overlaying the ferroelectric capacitor 24 is kept relatively low.

And the Azuma Patent in general relates to an encapsulated capacitor structure and method where the capacitor structure is created by selectively depositing a lower electrode, a dielectric thin film of BST or other ferroelectric, and an upper electrode, onto a substrate, and subsequently depositing a conformal layer of a non-reductively deposited dielectric material.

Contact windows are then open through the encapsulating layer for contacting the capacitor electrodes. The underlying structure is protected by the encapsulating layer from metallic deposition and post-processing which would otherwise damage the structure.

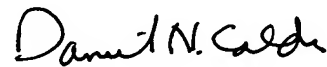
But nowhere in either the Zafar Patent or the Azuma Patent is there any teaching or suggestion of the First and Second Contact Windows Feature of Applicants' claimed invention. That is to say, neither the Zafar Patent nor the Azuma Patent teach or suggest that a contact window provided for the upper electrode is provided on the titanium material layer, or that the interconnect material layer, which is provided over and inside the contact window that is provided for the upper electrode, acts as an upper electrode.

Applicants further note that the previously cited reference to Summerfelt also lacks any teaching or suggestion of the First and Second Contact Window Feature of Applicants' claimed invention.

Based on the foregoing discussion, Applicants respectfully submit that claim 8, and dependent claims 9-11 are patentably distinguished from the references of record. Accordingly, the § 103(a) rejection should be withdrawn.

Based on the foregoing, claims 8-11 are in condition for allowance. Reconsideration and allowance of all pending claims are respectfully requested.

Respectfully submitted,



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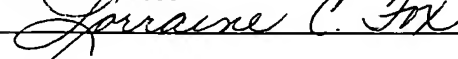
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